

**ADDENDUM TO**

**DRAFT BAY AREA**

**'91 CLEAN AIR PLAN (CAP)**

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# BAY AREA AIR QUALITY MANAGEMENT DISTRICT

June 18, 1991

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**TO: INTERESTED PERSONS**

**FROM: MILTON FELDSTEIN, AIR POLLUTION CONTROL OFFICER**

**SUBJECT: CHANGES AND ADDITIONAL INFORMATION FOR THE  
DRAFT BAY AREA '91 CLEAN AIR PLAN (CAP)**

In April, a draft '91 Clean Air Plan was released for public review and comment. The Plan was prepared by three regional agencies:

Bay Area Air Quality Management District (BAAQMD),  
Association of Bay Area Governments (ABAG), and  
Metropolitan Transportation Commission (MTC).

Eight public information meetings were held to publicize the Plan and invite comments. In response to comments received and additional staff analysis, we have--

- 1) made some changes in the Draft Plan,
- 2) provided additional information on some plan elements and on the process used to develop the proposals, and
- 3) summarized the future schedule.

1) Changes

- a. Replace page 16, Table 2 - Bay Area Emission Inventory Trends
- b. Page 24, Table 4 - Projected CO Inventory: Santa Clara County. Total - Mobile Sources for 2010 should be 511 (not 421).
- c. Replace page 31, Table 6 - CCAA Rate of Emission Reductions.
- d. Replace page 52, 53, and 54: Table 8 - 1991 Clean Air Plan Proposed Stationary Source Control Measures.

Changes in the proposed level of control and/or implementation schedule have been made for NOx control measures D1, D2, D3, D4 and D7. The following measures originally proposed have been deleted: D8, "Further Emission Reductions from Residential Furnaces", E2, "Control of Emissions from Asphalt Concrete Plants", and E4, "Incinerator Efficiency Requirements." Measures F2, G4, H2

# WYAREA AIR QUALITY MANAGEMENT DISTRICT

January 1997



## WYAREA AIR QUALITY MANAGEMENT DISTRICT

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and H4 have been changed to contingency status. The title and description of H3 have been modified. Also note that some of the measures on page 54 are not stationary source controls, but are listed in Table 8 because they came from a BAAQMD workshop process.

- e. Page 58, second column, ninth line should read: "Because the Bay Area is a severe area, any State mobile source measure being carried out in Southern California should also be implemented in the Bay Area on the same schedule."
- f. Page 59, first column, fifth line, delete: "This last set of proposals is not part of the '91 CAP."
- g. Replace page 61, Table 10 - Summary of TCM Plan Emission Reductions.

2) Additional Information (attached)

- a. Description of process and criteria for Plan Proposals, that is, how we got to the Bay Area Proposal in Table 8 and Figure 11.
- b. Description of Transportation Control Measures (TCMs) listed in Figure 11 on page 60.
- c. Emission Reduction and Cost Effectiveness Estimates for TCMs.

3) Future Schedule

- o Distribute Draft EIR on '91 CAP - late June
- o BAAQMD Board of Directors open Public Hearing on Draft CAP and Draft EIR July 3
- o BAAQMD Board continue Public Hearing July 24
- o Prepare Final Plan and Final EIR August
- o BAAQMD Board Public Hearing on Final EIR and Final CAP September 18

Thank you for your continuing interest in air quality. I hope that you will support our efforts to develop effective programs to achieve healthful air in the Bay Area.

and it is not clear whether the results of this study are generalizable to other populations. The authors also note that the study was limited by the use of self-reported data, which may be subject to recall bias.

In conclusion, this study found that the prevalence of depression among adults in the United States is 10.4%. The authors suggest that further research is needed to explore the causes of depression and to develop effective interventions.

The authors thank the National Institute of Mental Health for its support of this research.

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**Table 2 . Bay Area Emission Inventory Trends: 1987-2000 (REVISED 6/18/91)**  
**Planning Inventory\* (Tons/Day)**

	1987			1994			1997			2000		
Base Year 1987	RHC	NOx	CO	RHC	NOx	CO	RHC	NOx	CO	RHC	NOx	CO
<b>Industrial/Commerical Processes/Facilities</b>												
Petroleum Refining Facilities	29	11	2	30	12	2	31	13	2	32	13	2
Chemical Manufacturing Facilities	5	2	28	5	2	31	6	2	33	6	3	34
Other Industrial Commercial/Processes/Facilities	22	--	--	16	1	--	17	1	--	18	1	--
<b>Petroleum Product/Solvent Evaporation</b>												
Fuels Refinery Evaporation	10	--	--	6	--	--	6	--	--	6	--	--
Fuels Distribution	24	--	--	24	--	--	25	--	--	25	--	--
Other Organic Compounds Evaporation	132	--	--	130	--	--	138	--	--	144	--	--
<b>Combustion — Stationary Sources</b>												
Fuels Combustion	8	157	356	8	150	388	9	156	401	9	164	414
Burning of Waste Material	1	1	2	1	1	2	1	7	8	1	7	8
<b>Combustion — Mobile Sources</b>												
Off-Highway Mobile Sources	57	96	269	65	112	310	63	119	328	63	124	342
Aircraft	17	16	59	18	18	68	19	18	72	19	19	74
On-Road Motor Vehicles	327	360	3017	166	248	2249	137	222	1939	110	202	1688
<b>Miscellaneous — Other Sources</b>												
	55	--	--	50	--	--	51	--	--	51	--	--
<b>Grand Total</b>	<b>687</b>	<b>644</b>	<b>3733</b>	<b>519</b>	<b>543</b>	<b>3050</b>	<b>501</b>	<b>538</b>	<b>2783</b>	<b>483</b>	<b>532</b>	<b>2562</b>

\* Anthropogenic or man-made ozone precursors (RHC & NOx) for summer operating day (does not include about 300 tons/day RHC from natural sources); CO emissions for winter operating day.





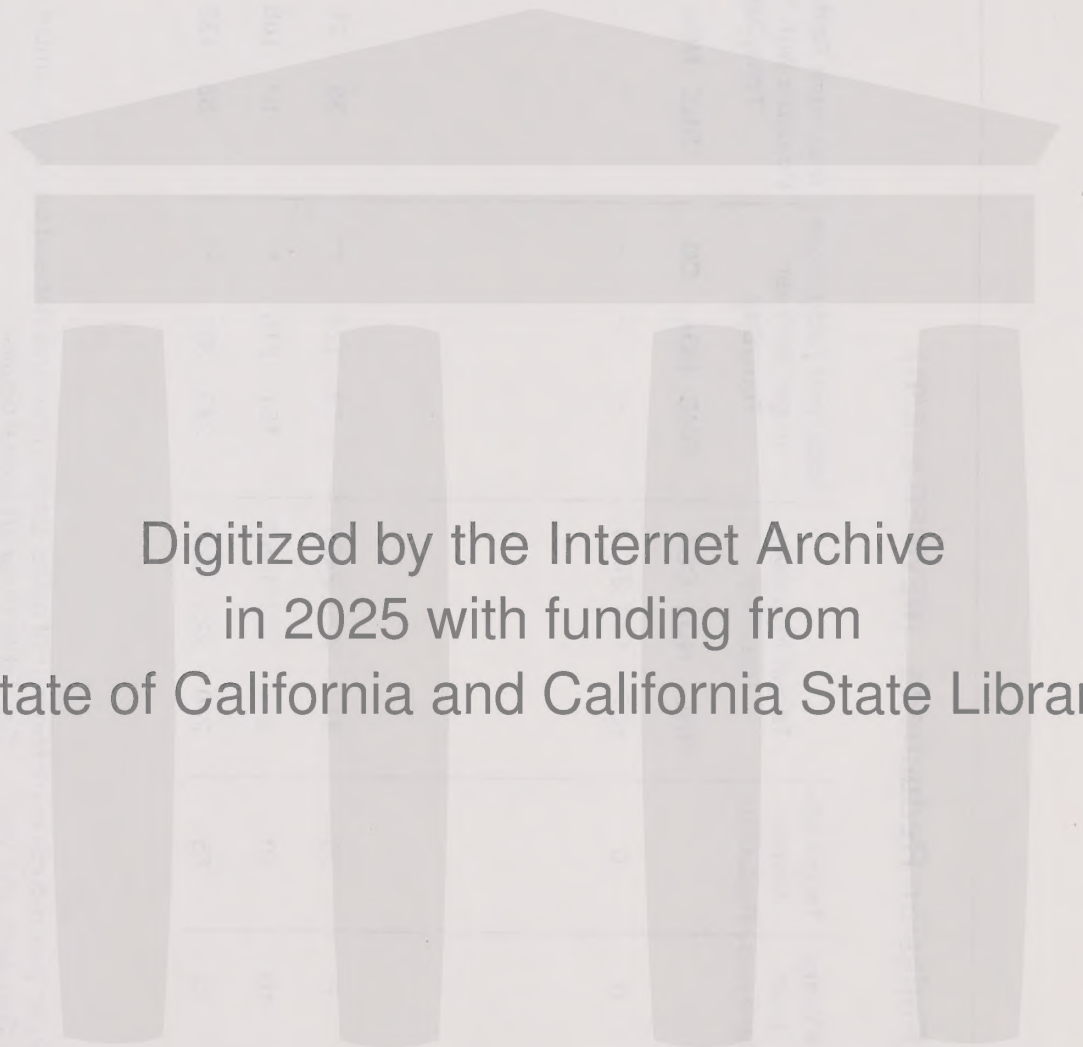


**Table 6 . CCAA Rate of Emission Reductions (REVISED 6/18/91)**

	Baseline Inventory Projections *			#Years from Baseyear	Target 5% Annual Reduction	Target Inventory Tons/Day			Additional Reductions to get 5%/Year Tons/Day			Maximum Reductions Possible with '91 CAP Tons/Day		
	RHC	NOx	CO			RHC	NOx	CO**	RHC	NOx	CO	RHC	NOx	CO
<b>1987 Baseyear</b>	687	644	3733	0	0	687	644	3733	--	--	--	--	--	--
<div> <div>↑</div> <div>'91 CAP</div> <div>↓</div> </div>														
<b>1994</b>	<b>519</b>	<b>543</b>	<b>3050</b>	7	35	447	419	<b>2426</b>	<b>72</b>	<b>124</b>	<b>**</b>	<b>39</b>	<b>25</b>	<b>**</b>
<b>1997</b>	<b>501</b>	<b>538</b>	<b>2783</b>	10	50	344	322	<b>1867</b>	<b>157</b>	<b>216</b>	<b>**</b>	<b>64</b>	<b>108</b>	<b>**</b>
<b>2000</b>	<b>483</b>	<b>532</b>	<b>2562</b>	13	65	240	225	<b>1307</b>	<b>243</b>	<b>307</b>	<b>**</b>	<b>88</b>	<b>136</b>	<b>**</b>

\* From Table 2.

\*\* Regional CO inventory targets for 5% per year reduction are shown, but actual targets and rates depend on nonattainment sub-area analyses for San Francisco, San Jose, and Vallejo. See Table 11 for additional details.



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**Table 8. 1991 Clean Air Plan Proposed Stationary Source Control Measures (REVISED 6/18/91)**

ID#	Title of Control Measure	Cost Effectiveness \$/Ton-Reduced	Emission Reduction Potential Tons/Day	Rate of Reduction Start Date	Technological Feasibility A thru D	Public Acceptance A thru D	Enforce- ability A thru D	Proposed Adoption
<b>D. COMBUSTION OF FUELS (NOx SOURCES)</b>								
D1	CONTROL OF EMISSIONS FROM NON-UTILITY RECIPROCATING ENGINES (a) Adopt NOx controls similar to existing SCAQMD Rule 1110.2	\$9300	(NOx) 6.87 - 8.83*	1/97	A	A	B	91 - 94
D2	CONTROL OF EMISSIONS FROM STATIONARY GAS TURBINES (a) Adopt NOx controls similar to existing SCAQMD Rule 1134	\$12,000	(NOx) 6.73 - 7.22*	1/96	A	B	B	91 - 94
D3	CONTROL OF EMISSIONS FROM ELECTRIC POWER GENERATING BOILERS (a) Adopt NOx controls based on add-on flue gas controls	\$14,000	(NOx) 13.1 - 15.0	1/97	B	B	B	91 - 94
D4	CONTROL OF EMISS. FROM BOILERS STEAM GENERATORS AND PROCESS HEATERS (a) Adopt NOx controls similar to existing SCAQMD Rule 1146 (1) Large Units (100 MMBTU/hr or larger) (2) Smaller Units (less than 100 MMBTU/hr)	\$10,000	(NOx) 37.7 - 43.1*	1/96 1/97	A A	B B	B B	91 - 94 91 - 94
D5	CONTROL OF EMISSIONS FROM CEMENT PLANT KILNS (a) Adopt NOx controls similar to existing SCAQMD Rule 1112 (b) Adopt NOx controls requiring flue-gas treatment	\$1000 \$2000	(NOx) 3.14 - 3.77*	1981 2000+	A D	B B	B B	91 - 94 2000+
D6	CONTROL OF EMISS. FROM GLASS MANUFACTURING PLANT MELTING FURNACES (a) Adopt NOx controls similar to existing SCAQMD Rule 1117	\$4000	(NOx) 2.79 - 3.41*	1/97	A	A	B	91 - 94
D7	CONTROL OF EMISSIONS FROM RESIDENTIAL WATER HEATING (a) Set NOx standards for new residential and commercial water heaters	\$1600	(NOx) .33 - .49	1/95	A	C	C	91 - 94
D8	DELETED							





**Table 8. 1991 Clean Air Plan Proposed Stationary Source Control Measures (REVISED 6/18/91)**

ID#	Title of Control Measure	Cost Effectiveness \$/Ton-Reduced	Emission Reduction Potential Tons/Day	Rate of Reduction Start Date	Technological Feasibility A thru D	Public Acceptance A thru D	Enforce- ability A thru D	Proposed Adoption
<b>E. OTHER INDUSTRIAL/COMMERCIAL PROCESSES</b>								
E1	CONTROL OF EMISSIONS FROM RUBBER PRODUCTS MANUFACTURING (a) Require abatement of ROG emissions from rubber product manufacturing operations	\$6000	unknown	7/99	C	A	B	98 - 2000
E2	DELETED							
E3	CONTROL OF EMISSIONS FROM COMMERCIAL CHARBROILING (a) Set ROG emission limits for commercial charbroilers	\$25,000	1.50	2000+	B	B	A	2000+
E4	DELETED							
<b>F. OTHER STATIONARY SOURCE CONTROL MEASURES</b>								
F1	IMPROVED NEW SOURCE REVIEW RULE (a) Adopt an NSR Rule that requires mitigation for all new/modified sources	unknown	1.14 (ROG) .53 (NOx)	7/91	B	B	A	91 - 94
F2	EMISSION MINIMIZATION MANAGEMENT PLAN (a) Market-based requiring no increase in emissions from major facilities	unknown	unknown	n/a	B	B	A	Contingency
F3	PROMOTION OF ENERGY EFFICIENCY (a) Establish a goal of increasing energy efficiency	unknown	unknown	1/92	A	A	D	91 - 94
F4	ENHANCED ENFORCEMENT OF EXISTING DISTRICT REGULATIONS (a) Adopt a program to increase compliance with District regulations	unknown	unknown	7/95	A	A	C	91 - 94





**Table 8. 1991 Clean Air Plan Proposed Stationary Source Control Measures (REVISED 6/18/91)**

ID#	Title of Control Measure	Cost Effectiveness \$/Ton-Reduced	Emission Reduction Potential Tons/Day	Rate of Reduction Start Date	Technological Feasibility A thru D	Public Acceptance A thru D	Enforce-ability A thru D	Proposed Adoption
<b>G. INTERMITTENT CONTROL MEASURES</b>								
G1	CITIZEN POSTPONEMENT OF DISCRETIONARY ACTIVITIES (a) Encourage postponement of certain activities during forecast ozone excess days	no cost	7.3 - 14.8 (R) .50 - 1.0 (N)	7/92	B	C	D	91 - 94
G2	INDUSTRIAL POSTPONEMENT OF ACTIVITIES DURING FORECAST OZONE EXCESS DAYS (a) Require postponement of certain industrial activities during forecast ozone excess days	unknown	3.7 - 4.2 (R) .11 - .12 (N)	1/93	B	B	A	91 - 94
G3	OZONE EXCESS 'NO DRIVE DAYS' (VOLUNTARY) (a) Adopt a program to discourage auto use during forecast ozone excess days	unknown	4.1 - 8.3 (R) 4.6 - 9.1 (N)	7/92	C	C	D	91 - 94
G4	OZONE EXCESS 'NO DRIVE DAYS' (MANDATORY) (a) Require employer-based VMT reductions during forecast ozone excess days	unknown	7.1 - 14.2 (R) 8.0 - 16.0 (N)	n/a	C	D	C	Contingency
<b>H. MOTOR VEHICLES**</b>								
H1	SMOKING VEHICLE PROGRAM (a) Adopt a citizen complaint program for smoking vehicles	unknown	.07 (ROG) .19 (NOx)	1/95	A	A	D	95 - 97
H2	HIGH POLLUTING VEHICLE RETIREMENT PROGRAM (a) Adopt a program for the purchase and destruction of old automobiles	unknown	.23 (ROG) .08 (NOx)	n/a	B	A	D	Contingency
H3	REQUIREMENT FOR CLEAN VEHICLES IN FLEETS (a) Require large fleets to use cleaner vehicles	unknown	.43 (ROG) .13 (NOx)	7/95	A	A	C	95 - 97
H4	URBAN BUS SYSTEM ELECTRIFICATION (a) Require electrification of high-use urban bus routes	unknown	.30 (ROG) 1.92 (NOx)	n/a	A	A	A	Contingency





City of Vallejo. Statistical analysis of these areas for the three years results in "design values" or maximum expected air quality levels as shown:

<u>Area</u>	<u>CO Design Value (ppm)</u>	<u>Emission Reductions to Meet Standard</u>
San Francisco	10	10%
San Jose	12	25%
Vallejo	11.5	22%

Table 11 presents the CO rate of emission reductions for the three areas noted. Depending on local weather conditions and the schedule for implementing a regional oxygenated fuels program, all three nonattainment sub-areas are projected to meet the state CO standard within the next few years. San Francisco is the closest currently. Vallejo and San Jose are projected to meet the CO standard by the mid-90s.

**Table 10 . Summary of TCM Plan Emission Reductions (REVISED 6/18/91)**

	<u>Percent Change in</u>			<u>Emission Reductions Tons/Day</u>		
	<u>RHC</u>	<u>NOx</u>	<u>CO</u>	<u>RHC</u>	<u>NOx</u>	<u>CO</u>
<b>Phase I:</b> Reasonably Available Measures and Federal TCMs by 1994	-6.5	-6.5	-6.9	11	16	155
<b>Phase II:</b> Mobility Improvements and Federal TCMs by 1997	-5.9	-5.6	-6.2	8	12	120
<b>Phase III:</b> Market-Based Measures (Implementation Date Calculated to 2000)	-20.6	-15.5	-22.5	23	31	380
<b>Net Results</b> (Assumes Phase I, II, III by 2000)	-30.1	-25.5	-32.3	33	52	545

(Net Results less than sum due to interactions among measures.)



## 2.a. DESCRIPTION OF PROCESS AND CRITERIA FOR PLAN PROPOSALS

Air quality planners and engineers are involved in a continuing effort to identify and control air pollutant emissions. These efforts were focused and formalized in 1989 as part of the '91 CAP development process.

Comprehensive lists of possible control measures were compiled for both stationary and transportation-related air pollution sources.

### Transportation Control Measures

The Metropolitan Transportation Commission organized a task force to consider transportation control measures (TCMs). The group met monthly during 1989 and 1990. An early product of the group effort was a comprehensive list of possible transportation control measures. The measures were analyzed and screened with respect to their potential effectiveness, costs, funding, responsibility, authority, equity and possible implementation schedule.

The final result of that process was the TCM Plan submitted to the BAAQMD in November 1990. That Plan, with slight modifications, was incorporated into the '91 CAP as summarized in Figure 11 on page 60 of the April 1991 Draft.

The transportation-related requirements of the California Clean Air Act of 1988 specify some of the Plan elements, including indirect source controls and "reasonably available" transportation control measures.

The California Air Resources Board (ARB) has provided guidance and regulations based on their interpretation of the California Clean Air Act. The ARB will review the Bay Area '91 CAP for compliance. ARB Transportation Requirements Guidance (Feb '90) lists the following measures as reasonably available:

1. Employer-based trip reduction rules.
2. Trip reduction rules for other sources that attract vehicle trips.
3. Management of parking supply and pricing.
4. Regional high occupancy vehicle system plans and implementation programs (carpool and bus lanes).
5. Comprehensive transit improvements program for bus and rail.
6. Land development policies that support reductions in vehicle trips.

The '91 CAP includes indirect source controls and all of the above "reasonably available" TCMs, plus other feasible transportation measures from the TCM task force process, as necessary to achieve the 1.5 average vehicle ridership target in the California Clean Air Act.





## **2b. DESCRIPTION OF TRANSPORTATION CONTROL MEASURES**

### **TCM #1 - EXPAND EMPLOYER ASSISTANCE PROGRAMS**

- Expand public sector support for employer-based trip reduction programs.
- RIDES, Commuter Network and other ridesharing assistance organizations will provide training for Employer Transportation Coordinators.
- RIDES will provide an expanded training and education program through workshops for employer program managers and city and county TSM managers.
- RIDES will assist trip reduction efforts at major employers by providing on-site consultations and informational mailings, supporting company vanpool programs, and promoting sales of transit tickets (see TCM 13).
- Monitor employee commute patterns via surveys to analyze the effectiveness of employer programs and identify successful approaches.
- Assist in establishing Transportation Management Associations.

### **TCM #2 - ADOPT EMPLOYER-BASED TRIP REDUCTION RULE**

- MTC has developed a "model" trip reduction ordinance to provide guidance for cities and counties that are developing trip reduction programs in response to Congestion Management Plan requirements.
- Air District will adopt rule to require major employers to implement trip reduction programs. Specific provisions of the rule will be determined during Air District's rule-making process.
- Air District will delegate implementation of the regional trip reduction rule to cities and counties which meet the Air District's objectives, but Air District will implement if local jurisdictions do not.

### **TCM #3 - IMPROVE AREAWIDE TRANSIT SERVICE**

- MTC will work with regional transit operators to increase bus and train service (BART and Caltrain).
- Extension of Caltrain service to Gilroy; increase in Caltrain service from 54 to 66 trains per day.
- Rail service expansion will be based on service improvements contained in rail operator's Short Range Transit Plans.
- Goal for bus service is a 33% increase in service.





### Stationary Source Controls

A comprehensive list of potential stationary source controls (Table 7 in the Draft '91 CAP) was compiled from suggestions by BAAQMD employees and outsiders, the literature, and proposals from other jurisdictions. A committee of senior BAAQMD employees led by the Deputy Air Pollution Control Officer, Operations coordinated screening and analysis of the options. Those measures with insignificant emissions reductions, or with extreme costs, technical difficulties, or enforcement problems were not carried forward to the Draft '91 CAP proposals.

Many of the measures in Table 7 were carried through to the Table 8 proposal stage. Some were consolidated with others, some were adopted before the Draft '91 CAP was released, some measures fell under ARB jurisdiction, some were moved to contingency status, and some were eliminated as impractical.

Table 7 options consolidated into other Plan proposals include:

- Improved automobile refinishing rule.
- Limitation on the operation of sources of standby power.
- Indirect source review public transportation offsets.

Measures already adopted include:

- Further control of emissions from polyester resin use.
- Requirement for P/V valves at gasoline dispensing facilities.
- Requirement for vapor recovery at aviation refueling facilities.
- Improved natural gas and crude oil production facilities rule.
- Control of emissions from consumer products (aerosol paints).
- Control of emissions from utility equipment.

Measures under ARB jurisdiction include:

- Cleaner reformulated gasolines.
- Control of emissions from switching locomotives.
- Control of emissions from gasoline farm tractors.
- Control of emissions from diesel construction equipment.
- Control of emissions from off-road motorcycles.
- Control of emissions from consumer products (other than aerosol paints).

The remaining Table 7 options not carried through to Table 8 were eliminated because of the absence of sources, low emission reduction potential, coverage by other rules, technical impediments, extreme costs, or problems with enforceability.

Existing regulations, plus the new stationary source proposals carried through to the proposal stage, cover all the applicable measures on ARB's "List of Feasible Measures for Stationary Sources" (March 1991). A few measures on the ARB list are not considered because of there are no sources (such as kelp-processing) in the Bay Area.



- New service from the Berkeley and Richmond areas to San Francisco.
- New service by private operators from Port Sonoma and Harbor Bay Isle (Alameda) to San Francisco.
- Full implementation will require State legislation to provide additional revenues.

#### **TCM #8 - CONSTRUCT CARPOOL / EXPRESS BUSLANES ON FREEWAYS**

- MTC and Caltrans have developed "Year 2005 HOV Lane Master Plan" which will expand the existing 80 lane-miles to 480 lane-miles upon completion. Approximately 220 lane-miles are fully funded in current Transportation Improvement Program (TIP).
- MTC will follow up with studies/funding to implement facilities that support HOV lane usage, including Park & Ride lots, preferential parking policies, express bus service, special HOV ramps.

#### **TCM #9 - IMPROVE BICYCLE ACCESS AND FACILITIES**

- Transportation Development Act (TDA) Article 3 funds of \$3 million per year are available to expand regional system of bike lanes and bike routes.
- MTC will require local agencies to develop bicycle plans as a condition for receiving TDA funds.
- MTC will encourage transit operators to increase bicycle carrying capability and will encourage Caltrans to provide means for bicycles to cross all Bay bridges.
- Air District will encourage/require new developments to provide bicycle facilities via indirect source control (TCM 16).
- Full implementation of this measure requires State legislation to provide additional revenues.

#### **TCM # 10 - YOUTH TRANSPORTATION**

- MTC will allocate funds to transit operators for provision of youth discount tickets.
- MTC will allocate funds to school districts for provision of bus service and for purchase of clean fuel buses where emissions reduction benefits are high.
- RIDES and/or local agencies will encourage carpooling for high school students with cars.
- Implementation of this TCM requires State legislation to provide new funding.





- Transit operators will be encouraged to undertake comprehensive analyses of markets, routes and schedules.
- Full implementation of this measure will require legislation to provide additional State and Federal funding.

#### **TCM #4 - EXPEDITE AND EXPAND REGIONAL RAIL AGREEMENT**

- Based upon MTC's New Rail Starts Program (Resolution 1876) which contains a \$3.5 billion financial plan.
- Construction of BART extension from Daly City to Colma.
- If additional funding becomes available, accelerate construction of BART extensions to West Pittsburg, Warm Springs in Fremont, and San Francisco International Airport; extension of Caltrain to downtown San Francisco; and the Tasman Light Rail extension in Santa Clara County.

#### **TCM #5 - IMPROVE ACCESS TO RAIL AND FERRIES**

- Improve access to BART, Caltrain and ferries via feeder bus services, private shuttles from transit stations to employment centers, improved bicycle paths and bicycle facilities, and increased parking.
- MTC will review comprehensive rail access plans prepared by transit operators to determine the most cost-effective access improvements.
- Full implementation of this measure requires legislation to provide additional revenue.

#### **TCM # 6 - IMPROVE INTERCITY RAIL SERVICE**

- Implement new intercity rail service in the Sacramento-Oakland-San Jose corridor. Capital funding for this project is available through Propositions 108 and 116; operating funds must be secured.
- Initial service with three roundtrips per day may begin as early as autumn 1991, if Caltrans, Southern Pacific and Amtrak can complete operating agreement, with increased service in subsequent years.

#### **TCM #7 - IMPROVE FERRY SERVICE**

- Retain post-earthquake ferry service from Oakland/Alameda to San Francisco.
- Increase service on the existing Vallejo to San Francisco run (funded by Proposition 116).
- New service from the Berkeley and Richmond areas to San Francisco.





**TCM #11 - INSTALL TRAFFIC OPERATIONS SYSTEM**

- Caltrans is developing a Traffic Operations System (TOS) that includes traffic surveillance, ramp metering, traffic advisory signs and incident management.
- Segment 1 of the TOS, on routes that lead to the Bay Bridge, should be completed by autumn 1991. Full implementation of the TOS will cover 216 miles of regional freeway.
- MTC will seek funding for electronic toll collection equipment on the Bay Bridge.

**TCM #12 - IMPROVE ARTERIAL TRAFFIC MANAGEMENT**

- Caltrans will support existing signal timing programs funded via FETSIM (Fuel Efficient Traffic Signal Management Program).
- MTC will seek funds to expand signal timing program so that all eligible systems are updated.
- Local jurisdictions will study signal preemption for buses on arterials with high volume of bus traffic.
- MTC will encourage local agencies to incorporate arterial traffic management strategies into the travel demand element of Congestion Management Plans.
- With the exception of existing signal timing programs, full implementation depends on new funding.

**TCM #13 - REDUCE TRANSIT FARES**

- MTC will use existing statutory authority to improve coordination of service between transit operators.
- RIDES will publicize and promote employer distribution and subsidization of transit passes via the Regional Transit Connection (RTC) and "Commuter Check" programs.
- If funding is available (see TCM 21), MTC will provide revenue to subsidize feeder buses to BART, Caltrain and ferries; offer reduced fares for user that are especially sensitive to fare levels (eg. off-peak discounts, family discounts, tourist passes); and underwrite additional retail outlets for transit passes and ridesharing information based on the "Berkeley TRIP" model.



**TCM #14 - VANPOOL LIABILITY INSURANCE**

- RIDES will conduct a study of vanpooling in FY 1991-92. The study will assess the vanpool market and consider the need for establishing a publicly funded or subsidized vanpool insurance program to offset the high cost of vanpool liability insurance.
- Implementation of a publicly funded vanpool insurance program would require additional funding.

**TCM #15 - PROVIDE CARPOOL INCENTIVES**

- Employers will be encouraged to satisfy their responsibilities under the employer-based trip reduction rule (TCM 2) by implementing ridesharing subsidies.
- MTC and the Air District will support Federal legislation to improve tax incentives for ridesharing and transit.
- Air District will advocate free tolls at all times for high occupancy vehicles on regional toll bridges.
- MTC and RIDES will seek ways to offer incentives to carpools with three or more people.
- Full implementation will depend on new funding.

**TCM #16 - INDIRECT SOURCE CONTROL PROGRAM**

- Air District will develop rules to reduce vehicle trips to major residential developments, shopping centers, arenas, airports, universities, etc. Separate requirements will apply to new and existing developments.
- Specific measures may include review of site design to promote transit access and reduce need for motor vehicles; parking management; trip reduction programs; and emission offsets.
- New highways and road improvements which have the potential to generate additional traffic may also be classified as indirect sources.
- Air District will delegate implementation of indirect source control to cities and counties which meet Air District objectives, but Air District will implement if local jurisdictions do not.





**TCM #17 - CONDUCT PUBLIC EDUCATION**

- MTC and Air District conducted a public opinion survey regarding air quality issues in 1990.
- Air District is currently developing a public outreach campaign with a grant from EPA and will seek funds to continue the program on a long-term basis.

**TCM # 18 - ZONING FOR HIGH DENSITIES NEAR TRANSIT STATIONS**

- Via TCMs 16 and 19, Air District will encourage cities and counties to plan for high density, cluster development with mixed uses in vicinity of mass transit stations.
- Funds will be sought to enable local governments to prepare specific area plans for mass transit stations.
- This TCM will complement TCM 4, which outlines planned extensions for BART, Caltrain and Tasman light rail.

**TCM #19 - AIR QUALITY ELEMENTS FOR GENERAL PLANS**

- Air District will encourage cities and counties to include air quality elements in their General Plans. This will be a condition for delegation of TCM 16.
- Goal is to ensure consistency between air quality, land use, transportation, housing and related elements in each local plan, and to promote a balance between jobs and housing at the local level.

**TCM #20 - CONDUCT DEMONSTRATION PROJECTS**

- Air District and MTC will promote demonstration projects for new strategies to reduce motor vehicle emissions.
- MTC will submit a grant proposal to FHWA to establish a telecommuting prototype project in the Bay Area. If the proposal is approved in full, MTC will sponsor establishment of up to three telecommuting centers.
- Air District will seek private sponsors for telecommuting centers.
- Additional projects will be developed to assess use of electronic systems for toll collection and for congestion pricing of roadways, and to promote use of alternate fuel vehicles.



**TCM #21 - IMPLEMENT REVENUE MEASURES**

- Many of the measures in TCMs 1 through 20 require new funding to ensure full implementation. MTC and Air District will seek State legislation to raise additional revenue of about \$500 million per year.
- Potential sources of new revenue include an increase in bridge tolls to \$2, a \$4 per year increase in motor vehicle registration fees, and a regional gas tax increase.

**TCM #22 - IMPLEMENT MARKET-BASED MEASURES**

- "Market-based" measures have the potential to significantly reduce motor vehicle travel and congestion through pricing incentives and disincentives.
- Measures under consideration include a "smog fee" tied to emissions per vehicle, a significant regional gas tax increase, congestion pricing of major roadways, and parking charges for both work and non-work sites. For purposes of analysis, parking charges are set at 60 cents per hour up to \$3 per day. Gas taxes would increase to \$2 per gallon over a ten year period.
- All these measures, with the exception of parking fees, require authorizing legislation. Discussion and education are needed to build political and public support for these measures.
- Equity issues must be addressed so that market-based measures do not place an unfair burden on low income groups.





2)c. EMISSION REDUCTION & COST-EFFECTIVENESS ESTIMATES FOR TCMs (6/18/91)

TCM #	Percent Reduction			Emission Reduction (Tons/Day)			Cost-Effectiveness per Ton of RHC Reduced (in \$000)	
	RHC	NOx	CO	RHC	NOx	CO	Gross	Net <sup>a</sup>
TCM 1 - Expanded Employer Assistance Programs	0.18	0.18	0.17	0.24	0.40	3.30	21	(122)*
TCM 2 - Employer-Based Trip Reduction	3.57	3.67	3.76	4.89	8.15	72.90	163	45
TCM 3 - Improve Transit Service	1.46	1.36	1.34	2.00	3.02	25.98	600	435
TCM 4 - Expand Regional Rail System	0.86	0.76	0.86	1.18	1.68	16.68	492	338
TCM 5 - Improve Access to Rail	0.32	0.32	0.28	0.44	0.71	5.43	470	310
TCM 6 - Improve Intercity Rail	0.09	0.09	0.07	0.12	0.20	1.36	724	543
TCM 7 - Improve Ferry Service	0.05	0.04	0.03	0.07	0.09	0.58	965	860
TCM 8 - Construct HOV Lanes	0.64	0.58	0.62	0.88	1.29	12.02	458	263
TCM 9 - Improve Bicycle Access/Facilities	0.03	0.03	0.04	0.04	0.07	0.77	759	546
TCM 10 - Youth/Student Transportation	0.14	0.14	0.16	0.19	0.31	3.10	257	143
TCM 11 - Install Traffic Operation System	1.82	1.45	2.45	2.50	3.22	47.50	61	(89)

\* ( ) In last column indicate net savings



## 2)c. EMISSION REDUCTION &amp; COST-EFFECTIVENESS ESTIMATES FOR TCMs (6/18/91) (continued)

TCM #	Percent Reduction			Emission Reduction (Tons/Day)			Cost-Effectiveness per Ton of RHC Reduced (in \$000)	
	RHC	NOx	CO	RHC	NOx	CO	Gross	Net <sup>a</sup>
TCM 12 - Improve Arterial Traffic Flow	0.43	0.52	0.63	0.59	1.15	12.22	34	(88)*
TCM 13 - Reduce Transit Fares	0.32	0.32	0.31	0.44	0.71	6.01	243	84
TCM 14 - Vanpool Liability Insurance	0.02	0.02	0.01	0.03	0.04	0.19	396	217
TCM 15 - Provide Carpool Incentives	0.20	0.30	0.20	0.27	0.67	3.88	376	113
TCM 16 - Indirect Source Control Program	0.70	0.70	0.70	0.96	1.55	13.57	42	(132)
TCM 17 - Conduct Public Education	0	0	0	0	0	0	N/A	N/A
TCM 18 - High Density Near Transit	0.05	0.05	0.05	0.07	0.11	0.97	30	(182)
TCM 19 - Air Quality Elements for General Plans	0	0	0	0	0	0	N/A	N/A
TCM 20 - Conduct Demonstration Projects	0	0	0	0	0	0	N/A	N/A
TCM 21 - Implement Revenue Measures	1.80	1.90	1.77	2.47	4.22	34.32	b	
TCM 22 - Market-based Measures	20.62	15.53	22.54	22.70	31.30	380.00	c	

\* ( ) In last column indicate net savings





## **Assumptions for TCM Cost-Effectiveness Estimates**

All costs are expressed in 1991 dollars.

Emission reductions are based on on-road motor vehicle emissions inventory for 1997, except for market-based measures in TCM 22, which are based on Year 2000 inventory.

Cost/ton (gross and net) attribute all costs to RHC; costs are not distributed among all pollutants.

Net cost/ton is calculated by subtracting travel time savings from implementation costs. Travel time benefit is valued at \$5 per hour. No \$ value is attached to additional benefits, such as reduced fuel consumption, vehicle depreciation, etc.

Certain TCMs (expansion of transit, HOV lanes, traffic operations system) contain elements that are already partially or wholly funded. Expenditures from existing, committed funding sources are not included in cost-effectiveness calculations.

### **Notes**

- a. Net cost-effectiveness values in parentheses indicate that travel time benefits outweigh the program costs.
- b. TCM 21 consists of revenue measures to fund improved transportation options. The revenue measures, which require new legislation, would generate \$500-\$600 million per year via increased bridge tolls, vehicle registration fees and gas taxes. These revenues are factored into the cost-effectiveness calculations for TCMs which improve the regional transportation system. The emission reductions attributed directly to TCM 21 reflect the anticipated reduction in motor vehicle travel due to higher costs of travel.
- c. TCM 22 consists of market-based measures to be implemented in Phase 3. They include significant increases in regional gas taxes; parking fees; "smog fees" based on emissions per vehicle; and "congestion pricing" of roadways. Revenues generated by TCM 22 might be used to fund improved transportation alternatives. However, the emission reductions estimates for TCM 22 are based solely on the disincentive of higher driving costs; they do not reflect additional emission reductions that would be achieved by using revenues generated to fund improved transportation alternatives.



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# 5. Evaluation of the TCM (Therapeutic Control Model)

of costs and benefits in 1987 dollars

Therapeutic evaluation for TCM is based on a number of criteria. The first is the degree to which the model is able to predict the outcome of treatment. The second is the degree to which the model is able to predict the cost of treatment. The third is the degree to which the model is able to predict the benefits of treatment.

Cost-benefit ratios are calculated for each of the three models. The results are shown in Table 1. The results show that the TCM model has the highest cost-benefit ratio, followed by the TCM model, and then the TCM model.

The results of the evaluation are shown in Table 1. The results show that the TCM model has the highest cost-benefit ratio, followed by the TCM model, and then the TCM model. The results also show that the TCM model has the highest degree of predictability, followed by the TCM model, and then the TCM model.

Overall, the results of the evaluation show that the TCM model is the most effective and efficient model for predicting the outcome of treatment. The results also show that the TCM model has the highest degree of predictability, followed by the TCM model, and then the TCM model.

## Table 1

a. The cost-benefit ratios for the three models are shown in Table 1. The results show that the TCM model has the highest cost-benefit ratio, followed by the TCM model, and then the TCM model.

b. TCM 31 consists of a number of criteria. The results show that the TCM model has the highest cost-benefit ratio, followed by the TCM model, and then the TCM model. The results also show that the TCM model has the highest degree of predictability, followed by the TCM model, and then the TCM model.

c. TCM 32 consists of a number of criteria. The results show that the TCM model has the highest cost-benefit ratio, followed by the TCM model, and then the TCM model. The results also show that the TCM model has the highest degree of predictability, followed by the TCM model, and then the TCM model.